

13. (Original) The method of claim 10, wherein the rear surface is an approximately elliptical surface.

14. (Original) The method of claim 13, further comprising providing a cooling fluid in contact with the rear surface of the diaphragm.

15. (Original) The method of claim 14, further comprising altering a pressure of the cooling fluid.

16. (Original) The method of claim 10, further comprising actuating an actuator to apply pressure to the rear surface of the diaphragm.

17. (Original) The method of claim 10, wherein the diaphragm carrier is a pipe socket with circular outer cross-section.

REMARKS

Claims 1-17 are pending in this application, with claims 1 and 10 being independent. Applicant has amended claims 1 and 10. No new matter has been added by the amendments. Applicant submits that these amendments would place the claims into condition for allowance and such allowance is respectfully requested.

35 U.S.C. § 103

Claims 1-5, 8-13, 16, and 17 have been rejected as allegedly obvious over U.S. Patent No. 5,148,324 ("Van Amstel"). Applicant requests withdrawal of this rejection and allowance of the claims for the following reasons.

Amended claim 1 recites a deformable mirror comprising a reflecting surface disposed on a diaphragm; a diaphragm carrier that supports the diaphragm, wherein the diaphragm carrier has a circular perimeter and a countersunk portion that defines a non-circular, pressurizable rear surface of the diaphragm; and wherein the rear surface is an approximately rectangular surface,

an approximately oval surface, or an approximately elliptical surface, and wherein the rear surface is configured to enable variable aspherical deformation of the reflecting surface.

Amended claim 10 recites a method of reflecting a laser beam comprising directing the laser beam onto a deformable, reflecting surface, supported by a pressurizable diaphragm; and variably altering a pressure within a diaphragm carrier that supports the diaphragm to aspherically deform the shape of the diaphragm and the reflecting surface, wherein the diaphragm carrier has a circular perimeter and a countersunk portion that defines a non-circular, pressurizable rear surface of the diaphragm, and wherein the rear surface is an approximately rectangular surface, an approximately oval surface, or an approximately elliptical surface.

Van Amstel relates to a mirror unit including a fixed mirror holder having a curved support surface and a flexible mirror attached to the support surface to assume the shape thereof. See Van Amstel at col. 1, lines 4-20. In particular, as shown in FIGS. 1A, 1B, and 1C, and the text at col. 5, lines 9-14, Van Amstel provides that “[t]he flexible mirror is secured on the mirror holder 2 under elastic deformation by means of two clamping strips 8, one at each end of the mirror 4, and rests directly with its mirror side 5 on the support surface 3 of the mirror holder 2 without any intermediate layer”

However, Van Amstel does not disclose “a diaphragm carrier that supports the diaphragm, wherein the diaphragm carrier has a circular perimeter and a countersunk portion that defines a non-circular, pressurizable rear surface of the diaphragm; and wherein the rear surface is an approximately rectangular surface, an approximately oval surface, or an approximately elliptical surface, and wherein the rear surface is configured to enable variable aspherical deformation of the reflecting surface.”

Similarly, claim 10 requires “variably altering a pressure within a diaphragm carrier that supports the diaphragm to aspherically deform the shape of the diaphragm and the reflecting surface, wherein the diaphragm carrier has a circular perimeter and a countersunk portion that defines a non-circular, pressurizable rear surface of the diaphragm, and wherein the rear surface is an approximately rectangular surface, an approximately oval surface, or an approximately elliptical surface.”

Because the shape of the rear surface of the diaphragm that applies pressure to the mirror is non-spherical (e.g., rectangular, oval, or elliptical), the mirror is aspherical deformed, i.e., deformed by different amounts in perpendicular directions (i.e., along and perpendicular to the long axis of the rectangle, oval, or ellipse), such that the mirror has different focal lengths along the perpendicular directions. As explained in the application, a mirror that can be deformed in a non-spherical shape is particularly useful when the mirror is used to deflect a beam through a relatively large angle because such a mirror does not introduce substantial astigmatism in the reflected beam. See page 4, lines 24 – 28; page 5, lines 15 – 18; page 5, lines 26 – 28. In contrast, mirrors whose reflecting surface is deformed in a symmetric fashion, when used to reflect a beam through a large angle require an additional reflecting surface to correct the astigmatism introduced by the circular mirror. See the discussion of the prior art at page 2, lines 1 – 6, and FIG. 5, of the Specification.

Moreover, Van Amstel does not disclose that the curvature of the mirror can be altered during operation. Instead, Van Amstel describes a static mirror assembly including a flexible mirror secured to a mirror holder with a convex support surface by one or more clamping strips. Van Amstel describes that “[a]ny inadmissible transverse sagging of the mirror can be preventing by the exertion of a suitably chosen mechanical counterpressure on the rear side of the flexible mirror.” See Van Amstel at col. 4, lines 18-47. Accordingly, Van Amstel characterizes changes in the curvature of the mirror as undesirable and thus teaches away from the subject matter of the applicant’s invention.

Claims 1 and 10 are allowable at least these reasons, as are claims 5-9, which depend from claim 1 and claims 14-17, which depend from claim 10.

Claims 6, 7, 14, and 15 have been rejected as allegedly obvious over Van Amstel in view of U.S. Patent No. 5,020,894 (“Giesen”). Applicant requests withdrawal of this rejection and allowance of the claims because Giesen does not cure the deficiencies of Van Amstel.

Giesen relates to a mirror used to reflect a high power laser beam including a pressure element which is disposed against a rear side of the mirror and defines a space into which a fluid

is introduced at to deform the mirror. However, Giesen, like Van Amstel, does not disclose “a diaphragm carrier that supports the diaphragm, wherein the diaphragm carrier has a circular perimeter and a countersunk portion that defines a non-circular, pressurizable rear surface of the diaphragm; and wherein the rear surface is an approximately rectangular surface, an approximately oval surface, or an approximately elliptical surface, and wherein the rear surface is configured to enable variable aspherical deformation of the reflecting surface.”

For at least this reason, Giesen does not cure the defects of Van Amstel with respect to claims 6, 7, 14 and 15, and applicant submits that claims 6, 7, 14, and 15 are allowable.

Applicant requests withdrawal of this rejection and allowance of the claims.

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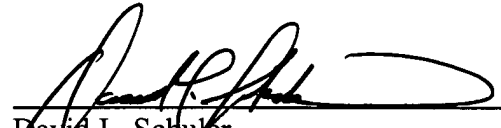
CONCLUSION

For the foregoing reasons, applicant requests allowance of all claims.

Enclosed is a check for the Petition for Extension of Time fee. Please apply any other charges or credits to deposit account 06-1050, referencing attorney docket number 15540-017001.

Respectfully submitted,

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